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INSPECTION & ACCEPTANCE TIMBER & LUMBER

*****GENERAL REWRITE – PLEASE READ CAREFULLY.*****

GENERAL

Wood products consist of untreated and treated timber, lumber, piles, posts, and signposts. Treated and untreated wood products shall conform to the requirements of the Iowa DOT Specifications, and as described herein in this IM. Inspection of treatment of wood products shall be performed by an independent treatment inspection agency engaged by the contractor directly or through the contractor's supplier. No direct compensation shall be made for inspection of treated wood products, as the costs of inspection are to be included in the unit bid price. Only treatment inspection agencies approved by the Iowa DOT shall be considered qualified to do inspection of treated wood products.

The treater shall be responsible for conducting appropriate inspection before treatment of the wood. The treatment inspection agency shall be responsible for conducting appropriate inspection and testing after preservative treatment of the wood. The treatment inspection agency shall submit an inspection report for each charge of material tested. A charge is defined as the entirety of all wood products treated in a cylinder at one time. A lot of material is the entirety of wood submitted to inspection at one time (Multiple charges may be inspected in a lot). A shipment is defined as the entirety of all wood products in each delivery to a project site. The Iowa DOT reserves the right to conduct monitor testing of wood products at the project site or from stored stock.

Each treatment plant shall have a Treatment Quality Control (QC) Program and qualified personnel to perform the treatment service. The Treatment Quality Control Program shall include testing of wood products and preservatives through the use of x-ray fluorescence spectroscopy. Quality Control reports shall be maintained for two years by the treater. Quality Control reports shall be made available to the treatment inspection agency and Iowa DOT upon request.

APPROVAL OF TREATMENT INSPECTION AGENCY

The initial approval of a treatment inspection agency will be based on a review of an application requesting to be approved for inspection service of timber, lumber, piles, posts and sign posts for contracts in which the Iowa DOT Specifications are specified. An approved treatment inspection agency is defined as a laboratory, which maintains personnel qualified to conduct inspection in the area of sampling and testing treated wood. The application shall contain contact information and experience summaries for personnel involved in testing activities. If the agency has multiple office locations, the different locations should be stated in the letter. An administrative officer of the agency shall sign and date the application and submit it for review to the Iowa Department of Transportation, Office of Materials, 800 Lincoln Way, Ames, Iowa 50010, Attention: Structural Materials Engineer.

Continued approval will be based on adequate inspection and reporting services and satisfactory results from monitoring inspections conducted by the Iowa DOT. In addition, a yearly update of the application shall be required. Inadequate inspection and reporting services or failure to provide a yearly update of the application may be considered sufficient cause to rescind approval of the treatment inspection agency.

Inspection conducted by an approved agency shall be in accordance with Section 1106 and other applicable requirements of the Standard Specifications. Such inspection shall not preclude actions described in Article 1105.04 of the Standard Specifications. Approved inspection agencies are listed in Appendix A of this IM.

UNTREATED TIMBER AND LUMBER

Unless otherwise stated, untreated timber and lumber shall conform to the requirements under Standard Specification Section 4162. Untreated wood that requires a grade shall be graded conforming to the grading rules approved by the American Lumber Standards Committee (ALSC). Under the ALSC program, Southern (Yellow) Pine shall be graded according to the "Standard Grading Rules for Southern Pine," written by the Southern Pine Inspection Bureau. Douglas Fir lumber shall be graded according to the "Standard Grading Rules for West Coast Lumber" written by the West Coast Lumber Inspection Bureau, or the "Western Lumber Grading Rules," written by the Western Wood Products Association.

All untreated wood material that requires a grade shall be stamped with the identifying quality grade mark of an accredited grade monitoring and inspection agency approved by the American Lumber Standards Committee (ALSC) under the Untreated Wood Program. Only the quality grade mark of grading agencies approved to grade lumber according to the three sets of grading rules as stated previously will be accepted. A list of typical quality grade marks of grade inspection agencies approved by the ALSC is included in Appendix B of this IM.

When material containing only one quality grade mark is later cut to shorter lengths, the remaining pieces may no longer contain a quality grade mark. For this material, the lumber mill/processor that re-sized the material shall provide a certification statement for the grade of the material. Refer to the Documentation Section of this IM. The pieces containing the grade mark shall accompany the material that does not contain grade marks after re-sizing.

NOTE: Material less than three (3) feet in length does not require a grade mark; however, a certification statement (as described in the Documentation Section) from the mill/processor certifying the grade of the material shall be provided. Round wood posts, round wood piles, and round wood poles do not require a grade, since the grading rules apply only to sawn material. All other sawn material shall be of the grade specified under the Iowa DOT Specifications.

TREATED TIMBER AND LUMBER

Unless otherwise stated, treated timber and lumber shall conform to the requirements of Sections 4160, 4161, and 4163 of the Standard Specifications. Treated wood posts shall conform to the requirements of Section 4164, and treated timber piles shall conform to the requirements of Section 4165. All treated timber and lumber products that require a grade, shall be made from untreated wood that has been graded as provided in the Untreated Timber and Lumber section of this IM. Unless the material is accompanied by a certification statement, material that does not contain a visible quality grade mark shall not be acceptable to receive preservative treatment.

NOTE: Material to be treated that is less than three (3) feet in length does not require a grade mark; however, a certification statement from the mill/processor certifying the grade of the material shall be provided prior to treatment. Round wood posts, round woodpiles, and round wood poles do not require a grade.

INSPECTION OF TREATED WOOD PRODUCTS

Inspection of treated wood products shall be conducted before and after treatment. The treater's Quality Control (QC) personnel shall be responsible for conducting *before-treatment* inspection at a minimum rate of once per charge.

The treatment inspection agency shall be responsible for performing *after-treatment* inspection. In addition, the treatment inspection agency shall verify that Quality Control records are being properly maintained and that the appropriate American Wood Preservers Association (AWPA) and Iowa Department of Transportation Specifications have been met. The treatment inspection agency shall furnish an inspection report for each charge of inspected and accepted material. The inspection report shall contain the information as prescribed in the Documentation Section and Appendix C of this IM.

When timber is processed at a plant/lumber mill and shipped to another location/treatment facility for preservative treatment only, the inspection prior to, and after treatment shall be performed at the preservative treatment plant.

Before Treatment Inspection:

The treater's QC personnel shall conduct the *before-treatment inspection* in accordance with AWPA M2 Part A, Section 2. The inspection prior to treatment (i.e., untreated wood inspection) shall be made after the products are completely processed and ready for treatment. The inspection prior to treatment shall ensure that all wood products are free of incipient decay and conform to the species, grade, quality, nominal dimensions, straightness, and other requirements under which it was specified. The material shall be treated within ten (10) days after the untreated wood inspection.

The treater shall have the responsibility to verify that all sawn wood material contains a visible quality grade mark, or is accompanied by a grade certification statement, prior to treatment.

If the treatment plant purchased the material to be treated, and it does not contain a visible quality grade mark or certification of grade, it is the treatment plant's responsibility to ensure that the material is properly graded and it is stamped with a quality grade mark, or proper certification of grade is obtained, prior to treatment.

If the treatment plant is performing a "Treatment Service Only," meaning the treatment plant did not purchase the material, but was contracted by another company (whether a lumber mill, lumber yard, supplier, etc) to provide the treatment service, and the material does not contain a visible quality grade mark, the treater shall notify the owner of the material immediately. It shall be the owner's responsibility to ensure that the material is properly graded and it is stamped with a quality grade mark, or proper certification of grade is obtained, prior to treatment.

The treatment plant's QC personnel shall perform the following prior to treatment:

1. Quality of Material: The plant's QC personnel shall inspect the material for evidence of decay, damage, and processor defects. Wood posts shall be inspected for species, size, length, quality and straightness prior to treatment. (Refer to Section 4164.)
2. Seasoning of Material: When sawed material is to be treated with waterborne preservative [CCA (Chromated Copper Arsenate)], the moisture content prior to treatment, as determined by resistant type moisture meter, shall not be more than 20% if kiln dried, or more than 23% if air dried. The moisture content shall be measured at a depth equivalent to the required penetration up to a maximum of 1.5 inches (38 mm). Record moisture reading for the material.
3. Quality Grade Mark: Unless the material is accompanied by a certification statement, treated wood products that require a grade shall have a legible and visible quality grade mark from an ALSC accredited agency listed in Appendix B of this IM. Refer to the Wood Product Markings Section of this IM. In addition, the QC personnel shall verify that the grade of lumber is appropriate for the intended use of the product as described in Table 1.

TABLE 1: Grades for Treated Timber and Lumber

Material	Species	Nominal Size	Grade	Moisture Content Prior to Treatment	Notes
Sawed Wood Posts	Southern Pine	Per contract documents	No. 1 or better	See Section 4161	1
	Douglas Fir	Per contract documents	No. 1 or better	See Section 4161	1,2
Wood Sign Posts	Southern Pine	4"x4"	No. 2 Dense	See Section 4161	
		4"x6"	No. 1 Dense	See Section 4161	
	Douglas Fir	4"x4"	No. 2	See Section 4161	2
		4"x6"	Dense No. 2	See Section 4161	2
All other	Douglas Fir	Per contract documents	See Section 4162	See Section 4161	1,2
	Southern Pine	Per contract documents	See Section 4162	See Section 4161	1

1. Material less than 3 ft. in length does not require a grade mark; however, a certification of grade must be provided.
Round material does not require a grade.
2. Douglas Fir (Coastal Region) shall be incised.

Any wood products not conforming to the Iowa DOT requirements shall not be accepted for treatment.

After Treatment Inspection:

Inspection *after treatment* shall be conducted by the treatment inspection agency in accordance with AWP A M2 Part A, Section 4. The treatment inspection agency shall be responsible for obtaining representative samples and testing for penetration and retention. Penetration testing for colorless or waterborne solutions shall be determined in accordance with AWP A A3 and M2 using reagents. Penetration test results of preservatives shall be in conformance with the appropriate AWP A standard for the commodity and species being considered.

Retention shall be determined by x-ray fluorescence spectroscopy in accordance with AWP A A9 for waterborne preservatives and pentachlorophenol. For creosote, retention shall be determined in accordance with AWP A A6. Retention levels of preservatives shall be in conformance with the minimum preservative retention requirements table in section 4161.03 of the Standard Specifications for the species and preservative being considered. The treatment inspection agency may use the treater's equipment or the inspection agency's own equipment to conduct after treatment testing.

A sample is the minimum number of borings taken per charge as specified in the appropriate AWP standard for the commodity and species being considered. To ensure a sample is representative, borings shall be taken from pieces that represent an equal proportion of the different sizes, seasoning, and location of pieces in the charge. With respect to grain orientation, borings shall be taken on a random basis. Abnormalities such as knots, shakes, split, etc. shall be avoided. For incised pieces, borings shall be taken midway on a line diagonally between adjacent incisions. All borings shall be taken approximately midway between ends, and from the edge containing the largest amount of sapwood. See Appendix D of this IM for an illustration.

The treatment inspection agency shall perform the following after treatment inspection:

1. Quality of Material: The treatment inspection agency shall inspect the material for any evidence of decay, processing requirements and defects, in addition to any damage to the material due to the treatment process. Wood posts shall be inspected after treatment for straightness. (See Section 4164.)
2. Moisture Content: Lumber 2 inches (50 mm) or less in nominal thickness that is treated with a waterborne preservative shall be dried after treatment to a moisture content of not more than 20% if kiln-dried, or not more than 23% if air-dried unless otherwise specified.
3. Penetration and Retention Tests: The treatment inspection agency inspector shall obtain core samples to perform penetration and retention tests in accordance with the applicable Iowa DOT and AWP Specifications. See Appendix D for additional information.
4. Treatment Inspection Agency Stamp: When size permits [2 inch x 2 inch (50 mm x 50 mm) and larger], the inspector shall place a stamp on one or both ends of each individual piece of inspected and accepted material after the treatment inspection. This stamp shall identify the treatment inspection agency and inspector that performed the inspection.

NOTE: Only the approved treatment inspection agency inspector performing the inspection shall stamp the accepted treated wood material.

5. It is the treatment inspection agency's responsibility to verify that all required product markings are on the material at the end of the inspection. Refer to the Wood Product Markings Section of this IM.
6. The treatment inspection agency shall write an inspection report according to the guidelines as described in the Documentation Section and Appendix C of this IM.

TREATMENT QUALITY CONTROL

The treater shall be responsible for conducting and documenting all Quality Control inspection. Quality Control shall be conducted before, during, and after treatment in accordance with AWP A Standard M3 Part A, and M2 Part A. The treater shall ensure proper documentation of Quality Control exists and if requested shall make Quality Control reports available for review by the treatment inspection agency and Iowa DOT.

Before Treatment Quality Control:

The treater shall conduct Quality Control before treatment in accordance with AWP A M2 Part A Section 2, and M3 Part A, Section 2. The treater shall be responsible to ensure all wood products are free of incipient decay and conform to the species, grade, quality, nominal dimensions, straightness, and any other requirements under which it was specified. Unless otherwise noted elsewhere, the treater shall determine moisture content required for every charge on at least the required minimum number of pieces, using a resistance type moisture meter. The moisture content shall be measured at a depth equivalent to the required penetration up to a maximum of 1.5 inches (38 mm).

During Treatment Quality Control:

The treater shall conduct Quality Control during treatment in accordance with AWP A M2 Part A Section 3, and AWP A M3 Part A, Sections 3, 4, and 5. Preservatives and treatment conditions shall meet the requirements of the appropriate AWP A standard for the commodity, species being treated, and preservatives used.

After Treatment Quality Control:

The treater in accordance with AWP A M2 Part A, Section 4, and AWP A M3 Part A, Section 6 shall conduct Quality Control inspection after treatment. The treater shall be responsible for obtaining representative samples and testing them for penetration and retention for their quality control program. Penetration tests for colorless or waterborne solutions shall be performed in accordance with AWP A A3 and M2 using reagents. Penetration of preservatives shall be in conformance with the appropriate AWP A standard for the commodity and species being considered.

Retention tests shall be determined by x-ray fluorescence spectroscopy in accordance with AWP A A9 for waterborne preservatives and pentachlorophenol. For creosote, retention shall be determined in accordance with AWP A A6. Retention results shall be in conformance with the minimum preservative retention requirements table in Section 4161.03 of the Standard Specification for the species and preservative being considered.

A Quality Assurance sample is the minimum number of borings taken per charge as specified in the appropriate AWWA standard for the commodity and species being considered. To ensure a sample is representative, borings shall be taken from pieces that represent an equal proportion of the different sizes, seasoning, and location of pieces in the charge. With respect to grain orientation, borings shall be taken on a random basis. Abnormalities such as knots, shakes, split, etc. shall be avoided. For incised pieces, borings shall be taken midway on a line diagonally between adjacent incisions. All borings shall be taken approximately midway between ends, and from the edge containing the largest amount of sapwood. See Appendix D of this IM for an illustration.

WOOD PRODUCT MARKINGS

1. Identification Mark or Brand

The treater shall mark all treated material with a permanent identification brand or mark. Acceptable brands or marks shall be similar to brands listed in AWWA Standard M6. A guideline for this brand is provided in Appendix F of this IM. The identification information may be heat branded, hammer stamped, or metal tagged. The identification shall be placed on each piece of treated material of 3 feet in length or larger per charge. The minimum information contained in the brand/mark/tag shall be the species of timber, the preservative treatment type used, the retention level and the treatment charge number. This brand/stamp/tag may be placed on the material before or after treatment, and prior to or at the time of the after-treatment inspection performed by the treatment inspection agency.

2. Treatment Inspection Stamp

When size permits [2 inch x 2 inch (50 mm x 50 mm) and larger], each piece of inspected and accepted material shall be stamped with a treatment inspection stamp by the treatment inspection agency after inspection. The stamp shall identify the treatment inspection agency and inspector that performed the inspection.

3. Quality Grade Mark

All untreated and treated wood material that requires a grade shall contain a quality grade mark of an accredited grade monitoring and inspection agency approved under the American Lumber Standards Committee (ALSC). A list of typical quality grade marks of grade inspection agencies approved by the ALSC is included in Appendix B of this IM.

NOTE: Material less than three (3) feet in length does not require a grade mark; however, a certification statement from the mill/processor certifying the grade of the material shall be provided. See Documentation Section of this IM. Round wood posts, round woodpiles, and round wood poles do not require a grade, since the grading rules apply only to sawn material.

When material containing only one quality grade mark, and the material is later cut to shorter lengths, the remaining pieces may no longer contain a quality grade mark. For this material, the lumber mill/processor that re-sized the material shall provide a certification statement to certify the grade of the material. Refer to the Documentation Section of this IM. The pieces containing the grade mark shall accompany the material that does not contain grade marks after re-sizing.

4. Additional Stamps or Marks

In addition to the required product markings, the contractor shall be responsible to ensure that any additional marks required (7-foot length mark on guardrail posts) elsewhere in the contract documents, are placed on the material prior to incorporation into the project.

DOCUMENTATION

1. Certification of Grade

A quality grade mark is required on each piece of material over three (3) feet in length. This quality grade mark shall suffice for certification of grade.

When graded lumber containing only one quality grade mark is later cut to shorter lengths, the smaller pieces may no longer contain a quality grade mark. For this material, the lumber processor that re-sized the material shall provide a certification statement of the following nature:

“This material has been processed from _____ (Fill in Species of Wood) _____ originally graded as _____ (Fill in Grade No.) _____, and it meets the applicable Iowa DOT Specifications and IM requirements.”

Material less than three (3) feet in length shall not require a grade mark; however, a certification statement as stated above from the mill/processor certifying the grade of the material shall be provided.

2. Certification of Treatment

The treatment inspection agency shall furnish an inspection report for each charge of material inspected. The inspection report shall include a certification statement in which the treatment inspection agency certifies that the material has been inspected according to the appropriate AWWPA Standards. In addition, the certification statement from the treatment inspection agency shall clearly express that the material has been inspected and it complies with the applicable Iowa DOT Specifications.

The treatment inspection report shall contain the minimum information required under the Inspection Report Guidelines as outlined in Appendix C of this IM.

A copy of all treatment inspection reports and any grade certification statements shall accompany all direct shipments from the treatment plant to a project site, and shipments to suppliers. Suppliers who furnish material from stock shall retain copies of all inspection reports for a period of three years.

The contractor shall be responsible to furnish a copy of all treatment inspection reports and any grade certification statements to the project engineer and the appropriate District Materials Engineer prior to the incorporation into the project. It shall be the contractor's responsibility to ensure the project number is provided on all inspection reports and certification statements.

MONITORING & INSPECTION

The District Materials personnel will be responsible for collecting random monitor samples of the treated wood products at the project site and/or from stored stock.

1. The minimum sample rate frequency is four samples per year, per District.
2. The District Materials Engineer will coordinate sampling and sampling rate.
3. In addition, random examinations of treated and untreated wood shall be conducted to ensure conformity to nominal dimensions and identify excessive damage or defects.
4. A sample shall consist of a minimum of ten cores or ten percent of the pieces; whichever is greater, up to a maximum of twenty cores per project for each type of material sampled. If a project contains less than ten pieces of the type of treated material sampled, the sample size shall be a minimum of five cores.
5. All borings shall be taken approximately midway between ends. All borings shall also be taken from the edge that contains the largest amount of sapwood and towards the heart of the lumber. See Appendix D of this IM for an illustration on how to take a core sample to obtain the largest amount of sapwood. Abnormalities such as knots, shakes, splits, etc., shall be avoided.
6. All borings obtained shall be stored in protective containers and on the container, the outer edge of the core shall be indicated.
7. An "Identification of Wood Boring Sample" Form shall accompany each sample. A copy of this form can be found in Appendix E of this IM.
8. Samples will be processed and tested by the Central Materials Laboratory.

ACCEPTANCE OF WOOD PRODUCTS

For wood products to be accepted for incorporation into Iowa DOT projects the following conditions shall be met:

1. **Identification Brand:** The treater shall mark all treated material with a permanent identification brand or mark. The identification brand/mark may be heat branded, hammer stamped, or metal tagged. For material treated with waterborne preservatives, the identification brand may be ink stamped, provided the information is clearly visible and legible. The minimum information contained in the brand/mark shall be the treatment charge number, the species of timber, the preservative treatment type used, and the retention level for the treated charge. Refer to Wood Product Markings Section of this IM and Appendix F for complete details. **NOTE:** For materials less than 3 feet in length, the bundle shall be identified with a plastic tag.
2. **Treatment Inspection Stamp:** When size permits [2 in. x 2 in. (50 mm x 50 mm) and larger], each piece of material shall contain a legible hammer-stamp from the treatment inspection agency to indicate the material has been inspected for treatment. Appendix A of this IM lists the approved Treatment inspection agency stamps
3. **Grade Stamp:** All material over three (3) feet in length requiring a grade shall have a visible quality grade mark on each piece of material. Refer to Wood Product Markings Section of this IM. Appendix B lists the acceptable typical grade marks.
4. For material less than three (3) feet in length, and material that does not contain a visible quality grade mark due to resizing, a grade certification statement from the lumber mill/producer shall be provided. Refer to Product Markings and Documentation Sections of this IM.
5. In addition to the product markings as stated above, any other marks (such as size, lumber mill name, etc) that are required in the contract documents are placed on the material prior to incorporation of the project. Refer to Product Markings Section of this IM.
6. The contractor shall provide the Project Engineer and appropriate District Materials Engineer with all treatment inspection reports and any grade certification statements prior to the incorporation of wood products into the project. Refer to the Documentation Section of this IM.
7. Iowa DOT monitor testing shall indicate that all specifications and commodity standards have been met.
8. Inspection reports and any requested Quality Control documentation shall indicate that all specifications and commodity standards have been met.

Should there be any discrepancies between the Iowa DOT test results and the treatment inspection agency test results or treater Quality Control, the Iowa DOT results shall be conclusive and binding. Before rescinding approval of a shipment based on test result discrepancies, the Iowa DOT shall conduct one additional penetration and retention test on the same shipment for re-verification. A noncompliant result from any additional re-verification tests shall be considered sufficient cause to rescind approval of a shipment.